



## Procedures and Guidelines

DIRECTIVE NO. 440-PG-8730.3.1  
EFFECTIVE DATE: April 12, 1999  
EXPIRATION DATE: April 12, 2004

APPROVED BY Signature:   
NAME: Dr. John Campbell  
TITLE: Assoc. Dir. Of Flight Projects for HST

---

**Responsible Office:** 440/Office of the Associate Director of Flight Projects for HST

**Title:** HST Third Servicing Mission Performance Assurance Implementation Plan (SMR-3090 Rev A)

---

### P1. PURPOSE

This Procedure and Guideline (PG) constitutes the HST Performance Assurance Implementation Plan (PAIP) for the Hubble Space Telescope (HST) Third Servicing Missions (3A and 3B). This Plan was approved March, 1999.

### P2. REFERENCE

GPG 8730.3      The GSFC Quality Manual

### P3. SCOPE

This Performance Assurance Implementation Plan (PAIP) identifies policies, methods, management, and organization for implementing the **ISO 9001 Compliant** Performance Assurance (PA) program on the HST Project for the Third Servicing Missions.

### P4. DEFINITIONS

None

### P5. AUTHORITIES AND RESPONSIBILITIES

As specified in the Plan.

### P6. CANCELLATION

None

### P7. RECORDS

None

### P8. IMPLEMENTATION

As specified herein.

**HUBBLE SPACE TELESCOPE  
LIBRARY #TM-024061**

**HUBBLE SPACE TELESCOPE  
THIRD SERVICING MISSION  
PERFORMANCE ASSURANCE  
IMPLEMENTATION PLAN**

**OCTOBER 1997**



**GODDARD SPACE FLIGHT CENTER  
GREENBELT, MARYLAND**

## HUBBLE SPACE TELESCOPE FLIGHT PROJECTS

Release

Date: April 8, 1999

## DOCUMENT CHANGE RECORD

Sheet: 1

TITLE: HST Third Servicing Mission Performance Assurance Implementation Plan		REVISION: Baseline Issue	
NUMBER: SMR-3090		DATE: October 17, 1997	
CHANGE NO. DATE:	TO INCORPORATE THE CHANGE INTO THE DOCUMENT: ADD PAGES: REMOVE PAGES:		CHANGE AUTHORIZATION INSTRUCTIONS, COMMENT
Baseline Issue 10/17/97			CCR 4503 Level 2 CCB Minutes #503 <i>Rob Stone</i> <i>12/18/97</i> <b>HST CM RELEASE</b>
----- SCN 001 3/5/99	----- iv, v, vi, vii, viii, ix, x, 1-1, 1-4, 5-1, 5-2, 5-2a, 5-4, 5-5, 5-7, 5-7a, 5-8, 5-10, 5-11, 5-12, 5-13, 6-5, 6-6, A-1	----- iv, v, vi, vii, viii, ix, x, 1-1, 1-4, 5-1, 5-2, 5-4, 5-5, 5-7, 5-8, 5-10, 5-11, 6-5, 6-6, A-1, A-2, A-3, A-4, A-5, A-6, A-7, A-8	----- CCR 4615 (PSCN 001) Level 2 CCB Minutes #524 <i>RAAS</i> <i>4/12/99</i> <b>HST CM RELEASE</b>

NOTE: After revising the document, file this sheet in document preceding table of contents.

October 17, 1991

## Table of Contents

<u>Section</u>	<u>Page</u>
1. PERFORMANCE ASSURANCE IMPLEMENTATION PLAN .....	1-1
1.1 Introduction.....	1-1
1.2 Scope.....	1-1
1.3 Requirements Summary.....	1-1
1.4 Surveillance of Contractors.....	1-2
1.5 Organization.....	1-3
1.6 Contracts.....	1-4
1.7 Applicable Documents.....	1-4
2. SYSTEM SAFETY .....	2-1
2.1 Safety Interfaces.....	2-1
2.2 Hazard Identification.....	2-1
2.3 Hazard Analysis.....	2-1
2.4 Safety Documentation.....	2-1
2.5 Safety Oversight Activities.....	2-2
2.6 Safety Review Activities.....	2-2
2.7 Launch Site Support.....	2-2
2.8 Mission Operations Support.....	2-2
3. ELECTRICAL ELECTRONIC ELECTROMAGNETIC PARTS .....	3-1
3.1 Scope .....	3-1
3.2 Basic PCP Components .....	3-1
3.2.1 Parts Control Board .....	3-1
3.2.2 Project Approved Parts List .....	3-1
3.2.3 Standard Parts .....	3-2
3.2.4 Nonstandard Parts .....	3-2
3.3 Parts Approved Flow .....	3-2

Table of Contents (Continued)

<u>Section</u>	<u>Page</u>
3.3.1 As-Designed Parts List Review .....	3-2
3.3.2 Nonstandard Parts Discussion .....	3-2
3.3.3. Procurement and Use Problems .....	3-4
3.4 Documentation .....	3-4
3.4.1 Parts List .....	3-4
3.4.2 Parts Control Board Documentation .....	3-5
3.5 Parts Requirements .....	3-8
3.5.1 Selection .....	3-8
3.5.2 Screening .....	3-8
3.5.3 Destructive Physical Analysis .....	3-8
3.5.4 Qualification .....	3-8
4. MATERIALS AND PROCESSES, RELIABILITY .....	4-1
5. QUALITY ASSURANCE .....	5-1
5.1 Out-of-House Work .....	5-2
5.2 In-House Work .....	5-3
5.2.1 Organization .....	5-3
5.2.2 Configuration Control and Verification ....	5-3
5.2.3 Procurement .....	5-3
5.2.4 Receiving Inspection .....	5-3
5.2.5 Control of Fabrication Activities .....	5-4
5.2.6 Logbooks .....	5-6
5.2.7 Contamination Control .....	5-7
5.2.8 Nonconformance Control .....	5-7

# Table of Contents (Continued)

<u>Section</u>	<u>Page</u>	
5.2.9 GIDEP Alert Processing (Deleted) .....	5-7	SCN 001
5.2.10 Control of Assembly and Inspection/Test Activities .....	5-7a	
5.2.11 Inspection Activity .....	5-8	
5.2.12 QA Activities During Integration and Test .....	5-9	
5.2.13 Records of Inspections and Tests .....	5-10	
5.2.14 Configuration Verification .....	5-11	
5.2.15 Calibration .....	5-11	
5.2.16 Stamp Control (Deleted) .....	5-13	SCN 001
5.3 KSC Operations .....	5-13	
6. SOFTWARE ASSURANCE .....	6-1	
6.1 Flight System Software .....	6-1	
6.2 Ground System Software .....	6-2	
6.3 Other Activities .....	6-3	
6.3.1 Advanced Camera for Surveys .....	6-3	
6.4 General SQE Activities .....	6-4	
6.4.1 Requirements Management .....	6-4	
6.4.2 Internal and formal Reviews .....	6-4	
6.4.3 Software Testing Monitoring and Review .....	6-4	
6.4.4 Configuration Management and Change Control .....	6-5	
6.4.5 Nonconformance Reporting and Corrective Action Tracking .....	6-5	
6.4.6 Audits and Reviews .....	6-5	

Table of Contents (Continued)

<u>Section</u>	<u>Page</u>
6.5 Other Activities .....	6-6
APPENDIX A HUBBLE SPACE TELESCOPE PROJECT ALERT PROCESSING WORK INSTRUCTION (Deleted) .....	A-1   SCN 001

FIGURES

<u>Figure</u>	<u>Page</u>	
3-1 HST Parts Review and Approval Process .....	3-3	
3-2 HST Nonstandard Part Approval Reports .....	3-7	
5-1 Work Order Authorization Form (Deleted) .....	5-5	SCN 001
A-1 Alert Disposition Form .....	A-6	
A-2 GIDEP Alert Processing for HST .....	A-8	



ACRONYMS

ACS	Advanced Camera for Surveys	
ADP	Acceptance Data Package	
AFPRO	Air Force Plant Representative Office	
CA	Corrective Action	SCN 001
CCB	Configuration Control Board	
CCR	Configuration Control Request	
CCS	Control Center System	
CDR	Critical Design Review	
CMO	Configuration Management Office	
CO	Contracting Officer	SCN 001
COPE	Contingency ORU Protective Enclosure	
COTS	Commercial Off The Shelf	
COSTAR	Corrective Optics Space Telescope Axial Replacement	
DCMC	Defense Contract Management Command	
DCAS	Defense Contract Audit Service	
DPA	Destructive Physical Analysis	
EEE	Electrical Electronic and Electromechanical	
EPDSU	Enhanced Power Distribution Switching Unit	
EPIMS	EEE Parts Information Management System	
		SCN 001
FMEA	Failure Mode Effects Analysis	
FRB	Failure Review Board	
FRR	Flight Readiness Review	
FS&S	Flight Systems and Servicing	
FSS	Flight Support System	
GEVS	General Environmental Verification Specification	
GIDEP	Government Industry Data Exchange Program	
GMI	Goddard Management Instruction	
GOTS	Government Off The Shelf	
GPG	Goddard Procedure/Guideline	SCN 001

ACRONYMS (Continued)

GSE	Ground Support Equipment	
GSFC	Goddard Space Flight Center	
HFMS	High Fidelity Mechanical Simulator	
HST	Hubble Space Telescope	
HSTARS	HST Anomaly Reports	
IMTE	Inspection, Measuring, and Test Equipment	SCN 001
ISO	International Standards Organization	
JSC	Johnson Space Center	
KSC	Kennedy Space Center	
LMMS	Lockheed-Martin Missiles and Space	
LOD	Letter of Delegation	
LOPE	Large ORU Protective Enclosure	
MAG	Mission Assurance Guidelines	
MGSE	Mechanical Ground Support Equipment	
MOU	Memorandum of Understanding	
M&P	Materials and Processes	
MSFC	Marshall Space Flight Center	
MULE	Multi Use Lightweight Equipment Carrier	
NCR	Non Conformance Report	SCN 001
NHB	NASA Handbook	
NICMOS	Near Infrared Camera and Multi-Object Spectrometer	
NSPAR	Non Standard Parts Approval Request	
NSSC	NASA Standard Spacecraft Computer	
O&GS	Operations and Ground Support	
ORU	Orbital Replacement Unit	

ACRONYMS (Continued)

ORUC	Orbital Replacement Unit Carrier
PA	Product Assurance
PAIP	Performance Assurance Implementation Plan
PAPL	Project Approval Parts List
PAR	Product Assurance Requirements
PASS	POCC Applications Software Support
PCB	Parts Control Board
PCP	Parts Control Plan
PDB	Project Data Base
PORTS	POCC Operation Real-Time Support
PPE	Project Parts Engineer
PPL	Preferred Parts List
PRB	Parts Review Board
PRS	PORTS Refurbishment System
QA	Quality Assurance
QAE	Quality Assurance Engineer
QCT	Quality Conformance Testing
QE	Quality Engineer
RAC	Rigid Array Carrier
RE	Responsible Engineer
SA	Software Assurance
SAC	Second Axial Carrier
SAM	Systems Assurance Manager
SIMS	Simulations
SITS	Science Instrument Test System
SM	Servicing Mission
SM3	Third Servicing Mission
SMGTS	Servicing Mission Ground Tests

SCN 001

ACRONYMS (Continued)

SCN 001

SOPE	Small ORU Protective Enclosure
SPAR	Standard Payload Assurance Requirement
SQA	Software Quality Assurance
SQEs	Software Quality Engineers
SSM	Support System Module
SSP	Satellite Servicing Project
STEMS	Space Telescope Equipment Management System
STIS	Space Telescope Imaging Spectrograph
SUDFS	Software Unit Development Folders
TAWS	Test Anomaly Work Sheet
TIM	Technical Interchange Meeting
TSAR	Test Simulation Anomaly Report
VEST	Vehicle Electrical System Test
WI	Work Instruction
WOA	Work Order Authorization

TBD LIST

ITEM NO.	TEXT LOCATION	TBD	RESP. PERSON	RESOL. DATE
1.	1.7 2.7	System Safety personnel will support launch site preparations in accordance with the Launch Site Safety Plan P-442-1500A (TBD)	S. DePalo/ 302/442	April 1999

## 1. PERFORMANCE ASSURANCE IMPLEMENTATION PLAN

### 1.1 INTRODUCTION

This Performance Assurance Implementation Plan (PAIP) identifies policies, methods, management, and organization for implementing the ISO 9001 Compliant Performance Assurance (PA) program on the Hubble Space Telescope (HST) Project for the Third Servicing Mission (SM3). The PA program supports the Associate Director of Flight Projects for HST, Code 440; the Flight Systems and Servicing (FS&S) Project, Code 442; and the Operations and Ground Systems (O&GS) Project, Code 441. The PA program consists of Quality Assurance (QA), Parts, Materials and Processes, Reliability, and System Safety, and Software Assurance.

SCN 001

SCN 001

### 1.2 SCOPE

This plan includes all of the Goddard Space Flight Center (GSFC) hardware and software elements of the SM3 including any Ground Support Equipment (GSE) [Vehicle Electrical System Test (VEST), High Fidelity Mechanical Simulator (HFMS), etc.]. HST crew aids and tools are also included in this plan.

### 1.3 REQUIREMENTS SUMMARY

Some of the existing flight and flight spare hardware was built under the direction of Marshall Space Flight Center (MSFC) and therefore was built to MSFC PA requirements, specifically the Orbital Replacement Unit Carrier (ORUC) and the spare Orbital Replacement Units (ORUs).

The Advanced Camera for Surveys is being built by Ball Aerospace/Boulder, Colorado. The Advanced Camera for Surveys PA program is subject to the requirements established in the HST PAR, document STR-43.

The Advanced Computer (486) is being fabricated by Jackson & Tull under the requirements of STR-27.

Some hardware (such as crew aids and tools) is fabricated under Code 700 contracts. Existing Code 700 contracts flow down applicable portions of SPAR-3 flight assurance requirements.

#### 1.4 SURVEILLANCE OF CONTRACTORS

PA surveillance is performed by using a combination of GSFC In-Plant Representatives, Defense Contract Management Command [DCMC, formerly known as DCAS or Air Force Plant Representative Office (AFPRO)], and GSFC PA audits.

The method of utilizing DCMC personnel is through the Letter of Delegation (LOD). QA responsibilities are delegated to DCMC by the LOD. These responsibilities are then flowed down to the appropriate DCMC office for any subcontracts the contractor may issue. LODs are in place for the following:

- Advanced Camera for Surveys (Ball LOD)
- Work under the NAS5-50000 Contract (LMMS LOD)
- Code 700 contracts (Swales LOD, Jackson & Tull LOD, etc.)

A GSFC PA In-Plant representative is located at Ball Aerospace/Boulder, Colorado.

GSFC provides the PA coverage for the VEST, HFMS, any in-house fabrication, testing at GSFC, and Kennedy Space Center (KSC) HST activities.

## 1.5 ORGANIZATION

The GSFC Assurance Management Office (Code 303) provides the primary interface between all of the elements of the Office of Flight Assurance (Code 300) and the HST Project. Two Flight Assurance Managers (FAMs) are currently assigned to the HST Project and are collocated with the Project. The HST System Safety Manager and HST Parts Engineer are also collocated with the Project.

UNISYS and Hernandez Engineering are the two Code 300 support contractors also assigned to the HST Project. UNISYS support includes Parts, Materials, and Quality Assurance. Hernandez Engineering (subcontractor to UNISYS) support includes System Safety and Reliability.

All Flight Assurance activities for HST are under the management direction of the FAMs. The FAMs will manage the Flight Assurance staff of the FS&S contractor.

## 1.6 CONTRACTS

Lockheed-Martin Missiles and Space Corp. (LMMS) is the prime contractor for the HST SMS. The Advanced Camera for Surveys is being designed, developed, fabricated and tested under contract to Ball Aerospace.

A variety of flight and non-flight hardware (particularly crew aids and tools) is fabricated by Code 700 contracts using many subcontractors.



## 1.7 APPLICABLE DOCUMENTS

The following documents provide information applicable to the contents of this document. These documents are subject to periodic revision. The user should, therefore, refer to the latest version.

SCN 001

- General Environmental Verification Specification,
- GEVS-SE
- HST Flight Projects Configuration Management Plan, SCM-1020
- HST SM Contamination Control Requirements, STR-29
- HST STIS and NICMOS Product Assurance Requirements, STR-43
- PAR for Satellite Servicing Project, 408-2175-0001
- Series of Workmanship Requirements, NHB 5300.4
- Standard Payload Assurance Requirements, SPAR-3
- HST Corrective Optics Space Telescope Axial Replacement (COSTAR) Performance Assurance Requirements, STR-27
- Flight Systems and Servicing Project HST Anomaly Reporting System Procedure, P-442-0787
- HST Ground Operations Safety Plan, P-442-0173
- HST Work Order Procedure, P-442-0770
- Flight Systems and Servicing Project HST Anomaly Reporting System General Requirements, P-442-0793
- HST Second Servicing Mission Orbital Replacement Instruments Data Requirements Document, SCM-1030
- HST SM3 KSC Cargo Launch Site Safety Plan, P-442-1500A (TBD)
- Goddard Procedures/Guidelines (GPGs)

SCN 001

## 2. SYSTEM SAFETY

The HST Systems Safety Program will be conducted in accordance with SMR-2092, "HST Systems Safety Program Plan".

### 2.1 SAFETY INTERFACES

System Safety will participate in all design review activities, review drawings, schematics, specifications and other documentation, and will closely interface with design-related organizations, such as system engineering, subcontractors, program managers and product assurance, as necessary.

### 2.2 HAZARD IDENTIFICATION

System Safety Engineering will review previous or historical safety data, as well as analyze the effect of stored energy items to derive a preliminary hazard list for all flight and ground equipment. Hazard resolution and risk acceptance is the responsibility of HST Program Management.

### 2.3 HAZARD ANALYSES

A number of hazard analyses will be performed by System Safety Engineering, such as preliminary hazard analysis, operations hazard analysis, material review and acceptance, flammability assessment, electrical assessment and ground support equipment assessment.

### 2.4 SAFETY DOCUMENTATION

System Safety Engineering is responsible for the generation of safety data packages for both ground and flight equipment.

Final "as signed" hazard reports will be maintained by System Safety. All supporting data will be maintained by the HST Project library.

## 2.5 SAFETY OVERSIGHT ACTIVITIES

System Safety activities include monitoring of testing, sub-contractor's safety activities, critical ground operations, and will review flight and ground procedures at both GSFC and KSC. Safety will also participate in all applicable reviews, such as the Design, Pre-environmental, Flight Readiness, and Pre-ship : Reviews.

## 2.6 SAFETY REVIEW ACTIVITIES

System Safety engineering will coordinate all Phase Reviews and Technical Interchange Meeting (TIM) activities at both Johnson Space Center (JSC) and KSC for flight and ground equipment.

## 2.7 LAUNCH SITE SUPPORT

System Safety personnel will support launch site preparations in accordance with the Launch Site Safety Plan, P-442-1500A (TBD). System Safety will maintain Mechanical Ground Support Equipment (MGSE) logbooks for the Project.

## 2.8 MISSION OPERATIONS SUPPORT

System Safety Engineering will participate in the SM3 operations, as well as the simulation exercises leading up to the mission. Mission operational procedures, flight rules, and annexes will also be reviewed for System Safety conformance.

### 3. ELECTRICAL, ELECTRONICS AND ELECTROMECHANICAL (EEE) PARTS

#### 3.1 SCOPE

The following Parts Control Plan (PCP) applies to all electrical, electronic, and electromechanical (EEE) parts to be installed on the Hubble Space Telescope (HST). All parts will be selected and screened in accordance with PPL-21 guidelines for Grade 2 parts or future Preferred Parts Lists (PPLs) as they are issued and will be reviewed by a Parts Control Board in accordance with the Parts Control Plan. The plan attempts to combine the intent of the Mission Assurance Guidelines (MAG) with the existing contractual requirements in place for HST programs.

#### 3.2 BASIC PCP COMPONENTS

##### 3.2.1 Parts Control Board

A Parts Control Board (PCB) will be formed specific to each program within the HST project. The PCB will consist of at least the HST Project Parts Engineer (a NASA employee), the contractor's EEE Parts Engineer, and one Parts Specialist. The Parts Specialist will have experience with the part type being discussed during a specific meeting of the PCB (i.e.: capacitors should be discussed with a capacitor specialist).

##### 3.2.2 Project Approved Parts List

The Project Approved Parts List (PAPL) for HST will consist of those parts listed in PPL-21, as issued in March, 1995 for grade 2 applications, as well as those parts discussed and approved by the PCB for grade 2 applications. In the latter case, the procurement part number and additional testing requirements shall be as listed in the NSPAR (Non-Standard Parts Approval Request). The PAPL will be maintained by the HST Project Parts Engineer, and will be cumulative (ie: NSPARs

approved by one PCB will be available for use by all other HST PCBs).

### 3.2.3 Standard Parts

Standard parts will be defined as those parts listed in the PAPL. Standard parts must be procured to the part number shown in the PAPL, and must receive any applicable additional testing (per PPL-21, Appendix A or a NSPAR).

### 3.2.4 Nonstandard Parts

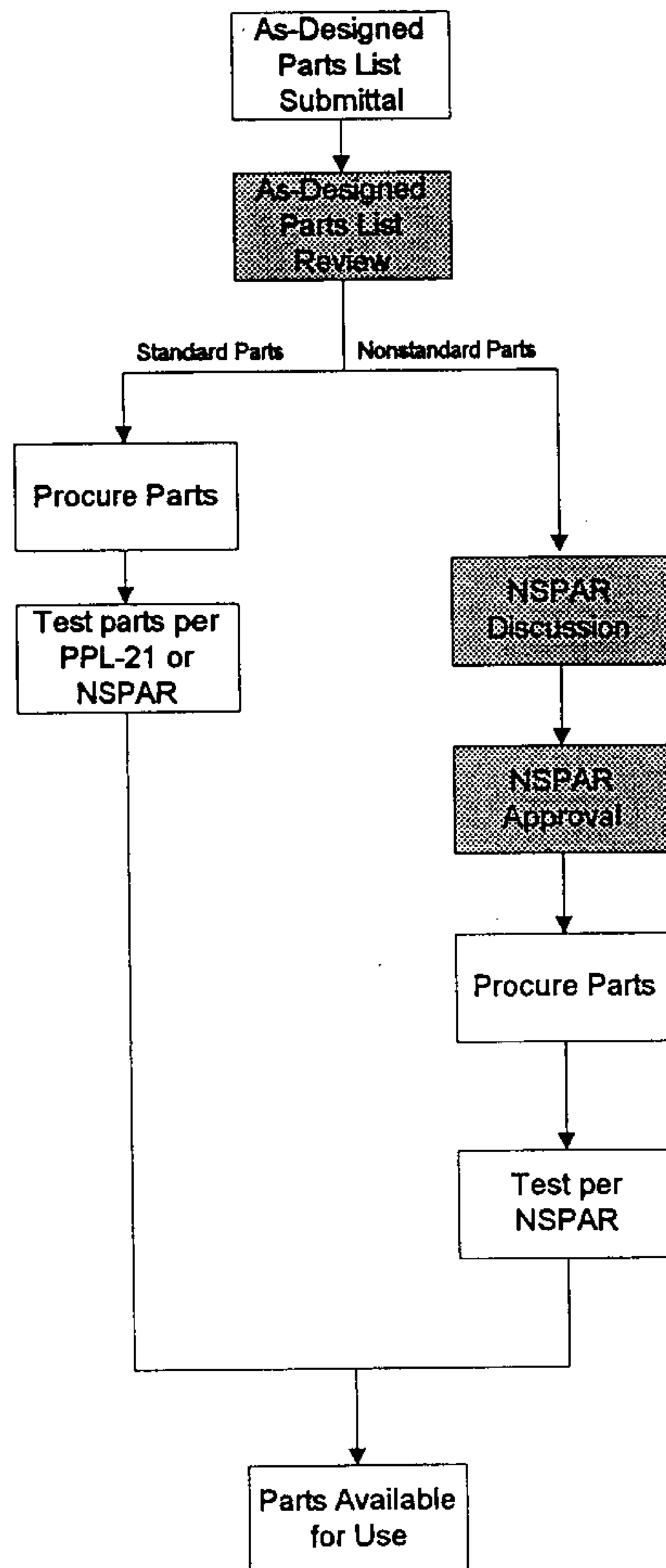
Any EEE parts not listed in the PAPL will be considered nonstandard parts, and will require review and discussion by the PCB prior to use. The PCB will discuss and decide upon the procurement of the part, as well as any additional testing needed. Decisions regarding the procurement and testing of the part are to be recorded using a Nonstandard Part Approval Report (NSPAR) signed by all members of the PCB. NSPARs approved prior to the implementation of this plan may be accepted at the discretion of the PCB.

## 3.3 PARTS APPROVAL FLOW

The EEE parts approval process follows the flow shown in Figure 3-1.

### 3.3.1 As-Designed Parts List Review

The contractor's EEE Parts Engineer will present an as-designed parts list to all PCB members for review. The list should be presented at least two weeks prior to the review and discussion by the PCB. During the discussion alternate parts may be recommended, and the status of the part (standard versus nonstandard) will be formalized. The as-designed parts list will also be presented to radiation specialists to determine the susceptibility of all active parts to both single event and



Note: shaded blocks are to be done by  
the Parts Control Board

Figure 3-1 HST Parts Review and Approval Process

total dose effects. All active parts on the as-designed parts list (both standard and nonstandard) will be reviewed, and the results presented to the PCB for consideration. Actions should be taken by the PCB in order to satisfy program requirements.

### 3.3.2 Nonstandard Part Discussion

The procurement and testing of all nonstandard parts must be discussed by the PCB prior to their procurement. The decisions of the PCB are to be documented using the NSPAR form. The susceptibility of any active parts to effects of radiation must be considered and documented on the NSPAR form.

### 3.3.3 Procurement and Use Problems

Any difficulties which occur during the procurement, testing, or use of parts should be discussed at the PCB meeting. The discussion must include the Parts Specialist. Any decision made regarding the resolution of such difficulties must be documented in the PCB meeting minutes. If necessary, the NSPAR should be altered to reflect any changes in the procurement or testing of the part.

## 3.4 DOCUMENTATION

### 3.4.1 Parts Lists

#### 3.4.1.1 Project Approved Parts List

The Project Approved Parts List (PAPL) for HST will consist of those parts listed in PPL-21, as issued in March, 1995 for grade 2 applications, as well as those parts discussed and approved by the PCB. In the latter case, the procurement part number and additional testing requirements shall be as listed in the NSPAR.

#### 3.4.1.2 As-designed Parts List

When the basic design of a program is reasonably solidified [but before the program Critical Design Review (CDR)], an as-designed parts list will be assembled by the contractor's EEE Parts Engineer. As a minimum, the list should identify the procurement part number, description, manufacturer if known, quantity, and whether the part is standard. The parts list should include all EEE parts currently used in the design, as well as those currently being considered for use. The format of the list should be compatible with standard spreadsheet based database software, and must be supplied to the HST Project Parts Engineer in electronic format.

#### 3.4.1.3 As-built Parts List

At the completion of a project, an as-built parts list will be assembled by the contractor's EEE Parts Engineer. As a minimum, the list should identify the procured part number, description, quantity, manufacturer, and date code for each EEE part used in the delivered product. The format of this list must be compatible with standard spreadsheet based database software, and must be submitted in electronic format.

#### 3.4.2 Parts Control Board Documentation

##### 3.4.2.1 Meeting Minutes

The topics of discussion and decisions made at each PCB meeting must be documented by the contractor's EEE Parts Engineer in the form of meeting minutes. A copy of the meeting minutes will be provided to the Flight Assurance Manager, and GSFC will retain the right to overturn decisions involving each non-conformance within ten days after receipt of meeting minutes.



#### 3.4.2.2 Nonstandard Parts Approval Report

The NSPAR form is shown in Figure 3-2, and should be filled in to reflect decisions and assessments made by the PCB with regards to procurement and processing of nonstandard parts. Each NSPAR will be assigned a unique number by the Project Parts Engineer. After approval by the PCB, copies of the form should be submitted to the contracting officer for the program and the Flight Assurance Manager.

#### 3.4.2.3 Waivers/Deviations

Where a test procedure must be used which is not in compliance with the test requirements, a waiver is required. All waivers should be discussed by the PCB prior to submittal. All waivers are submitted formally to the contracting officer for the program. Major and critical waivers require the approval of the HST Configuration Control Board.

#### 3.4.2.4 Parts Review Board

The PCB shall function as the Parts Review Board (PRB) when necessary. If a part fails to meet the criteria of a required test, that failure must be discussed and obtain disposition by the PCB. If the PCB disposition is to accept the parts, this must be documented in a formal memorandum to the HST Flight Assurance Manager. GSFC will retain the right to overturn decisions involving each non-conformance within ten days after receipt of the memorandum.

1. CONTRACT NUMBER	NAS5-	2. NSPAR NUMBER	4580000-XXX
3. PROJECT NAME	HUBBLE SPACE TELESCOPE	4. PROGRAM	
5. CONTRACTOR		6. SUBCONTRACTOR	
7. PART DESCRIPTION			
8. PROCUREMENT PART NUMBER		9. GENERIC PART NUMBER	
10. MANUFACTURER		11. MANUFACTURER'S CAGE CODE	
12. PROCUREMENT SPECIFICATION		13. SCREENING SPECIFICATION	
14. RADIATION REVIEW COMMENTS TOTAL IONIZING DOSE - SINGLE EVENT UPSET - SINGLE EVENT LATCHUP - SINGLE EVENT TRANSIENT -			
15. DPA TO BE PERFORMED? YES <input type="checkbox"/> NO <input type="checkbox"/>			
16. ADDITIONAL SCREENING TO BE PERFORMED			
17. QUALIFICATION TESTING TO BE PERFORMED			
18. RADIATION TESTING TO BE PERFORMED			
19. PARTS CONTROL BOARD SIGNOFF  HST PROJECT PARTS ENGINEER: _____ DATE _____  CONTRACTOR EEE PARTS ENGINEER: _____ DATE _____  PARTS SPECIALIST: _____ DATE _____			

Figure 3-2 HST Nonstandard Part Approval Report

### 3.5 PARTS REQUIREMENTS

#### 3.5.1 Selection

Preference will be given to standard over nonstandard parts, where practical. Standard parts are defined in section 3.2.2 of this document.

#### 3.5.2 Screening

The screening of all parts will be based upon the requirements of PPL-21, as issued in March, 1995. Parts which are considered standard by being listed in the PPL are to receive additional screening in accordance with PPL-21, Appendix A. All other standard parts will be screened in accordance with the applicable NSPAR. Screening requirements for nonstandard parts will be discussed relative to the requirements of PPL-21, Appendix C. Exceptions to those requirements may be made only with the approval of the PCB.

#### 3.5.3 Destructive Physical Analysis

Destructive Physical Analysis (DPA) per S-311-M-70 is required for all microcircuits, diodes, transistors, and nonstandard relays. Alternative sample size may be approved by the PCB.

#### 3.5.4 Qualification

Qualification testing is required for all nonstandard parts. Qualification requirements are to be based upon the Quality Conformance Testing (QCT) for the most similar military specification part. The qualification testing may be amended by the PCB as necessary to reflect the demands imposed by the operational environment of HST.

#### 4. MATERIALS AND PROCESSES, RELIABILITY

Materials and Processes (M&P) and Reliability requirements are specified in each PAR document.

Materials and Processes lists will be reviewed for all flight hardware to determine acceptability for use.

GSFC Reliability will assist the HST Project as requested in the performance of reliability predictions, Failure Mode Effects Analysis (FMEAs), fault tree analysis, etc. :

## 5. QUALITY ASSURANCE

This section will describe the QA effort as it pertains to the HST Project, Code 440 and the FS&S Project, Code 442. See Section 6 for the Software Assurance effort for the Operations and Ground Systems Project, Code 441.

SCN 001

There are several contracts in effect on the HST Project and several PAR documents. Work which is performed under Code 700 contracts is to meet the specific requirements of the SPAR-3, as stated on the task assignment itself. Work performed under the NAS5-50000 contract can be broken down into two categories. First, work associated with the three Carriers (ORUC, FSS, SAC, RAC, and MULE) and the Protective Enclosures (SOPE, LOPE, and COPE) is subject to the requirements stated in the PAR for the Satellite Servicing Project (document GSFC 408-2175-0001). This includes work on all carrier assemblies and subassemblies [for example the Enhanced Power Distribution Switching Unit (EPDSU) on the FSS]. Second, all other work performed under the NAS5-50000 contract is to meet the requirements in the HST COSTAR Performance Assurance Requirements (document STR-27). The Advanced Camera for Surveys is to meet the requirements in the HST STIS and NICMOS PAR (document STR-43).

The responsibility of invoking the PA program is dependent on which contract the work is being performed under. Listed below is the contract, responsible Office of Flight Assurance personnel, and applicable documents.

Code 700 Contracts:

Documents

FAM - Code 442

Applicable SPAR-3 requirements listed in matrix form and to the attached task assignment.

NAS5-50000 Contract:

FAM - Code 442

Carrier's Work (ORUC, FSS, and SAC)-  
Performance Assurance Requirements  
for the Satellite Servicing Project  
(GSFC 408-2175-0001)

All other work - (STR-27)

Science Instruments  
(Advanced Camera for Surveys)

FAM - Code 440

HST STIS and NICMOS PAR (STR-43)

GSFC QA will be managed by the Code 442 SAMs and will be performed by a combination of FS&S contractor QA staff and GSFC support contractor QA personnel. The SAMs will issue LODs as appropriate to perform government surveillance of all new contracts. HST "in-house" work will be performed by a combination of GSFC Code 303 staff and the FS&S contractor QA staff. This section will identify the QA planning for these two subsets separately. The QA "in-house" planning will be identified in detail.

SCN 001

SCN 001

## 5.1 OUT-OF-HOUSE WORK

The out-of-house work (Advanced Camera for surveys, etc.) requires QA as specified in the applicable PAR document. Government Source Inspection will be flowed down to DCMC

SMR-3090  
Baseline Issue  
March 5, 1999

[through the Contracting Officer (CO)] via a QA LOD issued by | SCN 001  
GSFC Flight Assurance. (See GPG 5100.3)

## 5.2 IN-HOUSE WORK

The remaining flight hardware elements and the GSE elements are included in the in-house work. Also included are the other activities pertaining to all of the hardware such as receiving inspection, integration and test involvement, etc. Existing HST and Code 300/303 procedures are implemented.

### 5.2.1 Organization

A combination of Civil Service, support contractor, and FS&S contractor personnel will be used to perform QA. This organization will be managed by Code 303 personnel.

### 5.2.2 Configuration Control and Verification

The FAMs are on mandatory distribution for every HST Configuration Change Request (CCR) with comments being forwarded to the Configuration Change Board (CCB).

QA performs the inspection of the hardware to ensure it matches the drawing requirements. For hardware fabricated at GSFC a detailed dimensional inspection may be performed offsite by UNISYS in their Lanham, MD facility.

### 5.2.3 Procurement

QA approves all procurements and imposes the applicable requirements on all subcontractors and suppliers.

### 5.2.4 Receiving Inspection

QA performs receiving inspection on all flight hardware and critical GSE received at GSFC. The results of the receiving



inspection are annotated on the HST Work Order authorization Form.

#### 5.2.5 Control of Fabrication Activities

The process by which work is authorized and performed is begun with the generation of the HST Work Order Authorization Form. The form is generated by the Responsible Engineer (RE) and must go through a sign-off process prior to the work being started and accomplished. (See HST Work Order Procedure, P-442-0770. The Configuration Management Office (CMO) opens the work order by assigning a number and the date. At this point, the work described can be performed.

SCN 001

The contractor Quality Assurance Engineers (QAEs) have been empowered to initially sign the work orders. The final event listed on every work order is the "Responsible Person/PA Review". The RE and either the SAM or the PA Engineer are required to sign this event. The work order is then submitted to the CMO for closure.

Finally, the work order is given back to the responsible QAE for incorporation into the hardware logbook. A more detailed description of the work order process is covered in the HST Work Order Procedure, P-442-0770.

The requirements of the NHB 5300.4 series of workmanship requirements are implemented as appropriate in fabrication activities. The QAE verifies fabrication NHB certification prior to any fabrication.

SCN 001

SCN 001

Figure 5-1. Work Order Authorization Form (Deleted)

The QA personnel are trained and certified as inspectors to the NHB requirements. QA personnel are recertified, as required.

#### 5.2.6 Logbooks

Hardware logbooks are being used for all flight and non-flight components and systems, most box and system test equipment, and to other such hardware as deemed necessary by the FAM. The QAEs are responsible for the generation and maintenance of these books and delegate maintenance of the MGSE logbooks to System Safety. As work is being done on the associated hardware it is the responsibility of the person performing the work to make the entries into the logbook on a daily basis as the work is accomplished. The QAE has the responsibility to ensure the logbook is kept current.

The format being used for the logbooks has been standardized and is being followed beginning with the generation of new books for the SM3. The book consist of nine sections, as listed below:

- I Shortages/Open Items
- II Serialized Accountability
- III Configuration Status
- IV In-Process Inspection
- V Anomaly Report Status
- VI Acceptance Test
- VII Chronological History

- VIII Mate/Demate Log
- IX Deviation/Waiver Summary

To ensure compliance with the new logbook format and currency of the information, periodic audits of the books will be performed by the PAE and QAEs amongst themselves. The log-books are closed after launch and are then provided to the HST Library for record keeping.

SCN 001

#### 5.2.7 Contamination Control

Cleanroom readings are reviewed on a sample basis to ensure proper cleanroom operation. Also, periodic walkthroughs to evaluate housekeeping practices are performed by QA.

#### 5.2.8 Nonconformance Control

QA ensures that a closed loop nonconformance control system for discrepancies and failures is in effect. All nonconformances, both at GSFC and KSC, will be controlled in accordance with P-442-0793, Flight Systems and Servicing Project HST Anomaly Reporting System General Requirements. The implementation of these requirements is included in P-442-0787, Flight Systems and Servicing Project HST Anomaly Reporting System Procedure. Any NCRs generated against Code 440 will be closed by the SAM and the Deputy Project Manager for Code 440.

SCN 001

#### 5.2.9 GIDEP Alert Processing (Deleted)

5.2.10 Control of Assembly and Inspection/Test Activities

Inspections and tests are performed on products before they are installed in the next level of assembly. The inspections and tests are performed per the WOA and annotated in the corresponding logbook. Each inspection and test will be traceable

to the individual responsible. QA will assure that tests are completed per the approved procedure. QA required inspections and/or tests will be identified on the WOA prior to approval. See P-442-0770 for other QA requirements regarding work orders and nonconformance reporting.

SCN 001

#### 5.2.11 Inspection Activity

##### 5.2.11.1 In-Process Inspection. Quality Assurance will:

- a. Confirm that the configuration complies to drawing requirements and workmanship prior to the next step of fabrication or integration.
- b. Perform in-process inspection in an environment dictated by the HST SM Contamination Control Requirements (STR-29).
- c. Ensure that only certified inspectors will be used for in-process inspection.
- d. Ensure performance of electrical interface tests of assemblies prior to their being integrated into the next higher level of hardware.

##### 5.2.11.2 Final Inspection. Quality Assurance will:

- a. Confirm completion of all previous operations, tests and their documentation.
- b. Ensure that all nonconformances have been processed to closure and that all open items have been transcribed into the next level of inspection or fabrication documents.

##### 5.2.11.3 End-Item Inspection. Quality Assurance will:

- a. Ensure that the Acceptance Data Package (ADP) is in compliance with the contract requirements
- b. Ensure that GSFC has authorized the delivery of the end-item with any open nonconformances and unresolved tasks that may exist.

5.2.11.4 Inspection and Test of Stored Stock Hardware.

QA will concur in the selection and frequency of product inspection and test and will approve the continuance of said products in stock and/or storage.

QA will witness the periodic testing of the spare ORUs. Logbooks will be maintained and all nonconformances will be documented.

5.2.12 QA Activities During Integration and Test

QA shall ensure that the product is integrated and tested in accordance with controlling documents. Product undergoing test will not be adjusted, modified, repaired, reworked, or replaced except as specified in approved documents. The status, configuration, and integrity of the product will be maintained and documented.

QA will provide surveillance of all tests to the extent defined in the test documents. QA will approve all test plans and procedures. As a minimum, the activities to be performed include:

- a. Pre-test QA Activity - Prior to each test, QA will ascertain:
  1. The presence of approved applicable inspection and test documents.
  2. The identification and configuration of the product.
  3. That test equipment is within the calibration period for the duration of the test.
  4. That test setup and test configuration is as specified in approved procedures.

b. Test Documentation - During each test, QA will ensure:

1. That tests are conducted in accordance with approved specifications and procedures.
2. Accurate and complete recording of data and results.
3. The documentation of all nonconformances, rework, repairs or modifications is generated.

c. Post-Test QA Activity - Subsequent to testing, QA will:

1. Ensure proper disposition of nonconforming products.
2. Verify that test results, reports, and nonconformance documents are accurate, complete, and traceable to the tested product.

#### 5.2.13 Records of Inspections and Tests

QA will ensure that the records of all inspections and tests are properly prepared and maintained. As the product is integrated, records of lower-level assembly products will be combined into those for the end-items as a means of compiling a continuous, chronological history of identified products, fabrication, assembly, and inspection actions.

#### 5.2.14 Configuration Verification

During the inspection process, QA will verify that the as-built product complies with the as-designed configuration listing.

#### 5.2.15 Calibration

The following steps shall be followed by the HST Project personnel to ensure implementation of GPG 8730.1 Calibration and Metrology.

SCN 001



- a) The Responsible Engineer (RE) shall ensure that Inspection, Measuring and Test Equipment (IMTE) are appropriate for the measurements made. This includes the capability and acceptability of test software and comparative references. Work instructions shall specify the appropriate IMTE and calibration requirements.
- b) Property Custodians shall ensure that IMTE are stored appropriately to maintain their accuracy.
- c) Quality Engineering shall ensure that IMTE meet work instructions requirements and are properly calibrated prior to use.
- d) IMTE missing calibration status shall be returned to the Property Custodian for return to the Metrology and Calibration Laboratory.
- e) If the calibration status of IMTE expire prior to the anticipated end of a test, the Test Engineer will preferably procure another IMTE. Otherwise, the Test Engineer shall not close the test procedure until the IMTE calibration is confirmed good. If the IMTE is subsequently found to be out of calibration, then the work shall be handled per paragraph (g).
- f) Property Custodians shall respond to calibration due notices in a timely manner. Property Custodians shall notify the Quality Engineering Office of IMTE:

SCN 001

- requiring calibration
- requiring repair
- requiring deletion from the list
- requiring hold status.

Quality engineering shall complete a Calibration and Repair Work Request Form 300-7, obtain HST Systems Assurance Management approval, and then coordinate IMTE processing with the Metrology and Calibration Laboratory. IMTE being put on hold are identified with a Calibrate Before Use tag; the Metrology and Calibration Laboratory are notified of the change with the Calibration & Repair Work Request Form 300-7.

- g) When a work order step is closed the operator shall ensure that the control numbers of the IMTE used in the operation are recorded. During work order closure, Configuration Control shall enter this IMTE information into a database.

SCN 001

If IMTE are subsequently found to be out-of-tolerance, the Configuration Control database shall be used to process effected hardware as nonconforming in accordance with GPG 5340.2, i.e.:

- Quality Engineering shall identify the hardware with nonconformance tags, enter the nonconformance into the NCR/CA database, and reference the NCR on the WOA.
- The RE shall segregate the hardware.

The RE and QE shall assess the validity of work done with the out-of-tolerance IMTE and the need for additional testing.

- h) Adjustments to IMTE that may affect calibration shall be made only by the RE or personnel authorized by the Test Procedure and only as specified in the procedure.

SCN 001

5.2.16 Stamp Control (Deleted)

5.3 KSC OPERATIONS

The approach towards QA coverage of the hardware while it is at the KSC is basically the same approach that is in place at GSFC. The number of civil servant QA people at KSC will be the same as the separate number of locations at which the hardware is located (for example if the hardware is separated into two locations there will be a civil servant QA person at each of the sites). There will be at least one Code 303 civil servant from the first arrival of hardware through launch. The contractor and support contractor QAEs will be utilized as necessary. GSFC QA is responsible for the hardware up until it is installed into the canister, from that point on KSC QA will be monitors of the hardware.

## 6. SOFTWARE ASSURANCE

The Software Assurance (SA) for the HST Operations and Ground Systems Project, Code 441, is provided by Software Quality Engineers (SQEs) who are directed by, and report to, the FAM. SA activities may be carried out at GSFC, contractor facilities, or other locations specified by the FAM.

The SQEs assigned to HST Code 441 provide support by arrangement with code 303, Assurance Management Office.

SQEs will interface with the HST Project at all levels throughout the entire life-cycle of a system or sub-system. SQEs assume activities to improve and ensure the software process and products by reviewing, monitoring and reporting responsibilities which range from System Engineering, software control boards, working groups through development, test and deployment of specific flight and ground software products.

For SM3, SQEs will focus on software activities relating to the transition of the DF224 to the HST 486 Computer, NASA Standard Spacecraft Computer (NSSC-1), Advanced Camera for Surveys (ACS) instrument and other systems as directed by the FAM.

### 6.1 FLIGHT SYSTEM SOFTWARE

Two main flight processors, the DF224 and NSSC-1, supporting engineering and science activities respectively, are currently on board HST.

The Support System Module (SSM) computer configuration currently on-orbit consists of a DF224 sharing memory with an 80386 coprocessor and all associated software. During SM3, an improved 486 processor will replace the DF processor. HST

ground software will also be redesigned. Periodically, software upgrades are made to NSSC-1 to meet evolving engineering and science requirements.

SA activities will focus on improving and ensuring the software process and products. SQEs will be available to support design reviews, code reviews, walkthroughs, testing and flight readiness activities for new software.

SQEs will also review the development and integration of Performance Assurance Requirements (PAR) for future HST software upgrades as well as the instruments on which the upgrades will run.

## 6.2 GROUND SYSTEM SOFTWARE

SQEs attend the Ground System Update meetings where the development, testing and release of new versions of ground system software (PASS, PRS, PDB, HST Simulator etc.) into the HST Operational System schedule are coordinated. SQEs attend selected review and design meetings related to these software developments at GSFC or at contractor facilities.

The major developmental change will be the merger/replacement of the Ground System Software elements and hardware components into the VISION 2000 - Control Center System (CCS). The SQEs will provide Quality Support for the developmental process and examine the activities related to this major ground system change. The SQEs will follow the development and transition to the Ground System (VISION 2000). This effort will be particularly important for HST SM3 and beyond.

The SQEs review ground system problem resolution for engineering working groups and software control groups under the HST Observatory Management System (HSTOMS)/(Code 510) Organization.

The SQEs also review the plans, procedures and anomaly closures for the major ground system tests (SMGTs and SIMS) required for SM3.

### 6.3 INSTRUMENTS

#### 6.3.1 Advanced Camera for Surveys (ACS)

The Advanced Camera for Surveys (ACS) will be installed in HST during SM3. Both the instrument and the associated software are being developed for HST at the contractor's site in Boulder, Colorado.

ACS project SQEs will conduct periodic surveys, assessments, evaluations and audits of the contractor's in-house software development, test and Quality Assurance activities. All activities which require ACS SQEs to carry out their responsibilities on-site will be coordinated with the contractor's Software Quality Assurance (SQA) representative(s). The purpose of site visits is to provide project management with insight into the contractor's SQA activities and the effectiveness of implementation throughout the entire software life-cycle.

ACS QEs will review and assess records and documents that result from the contractor's SQA activities. Findings from the contractor's internal audits of Software Unit Development Folders (SUDFs) will be carefully reviewed. In addition, ACS QEs will conduct reviews of technical documentation to determine that current revisions match the latest approved levels of requirements, design, interfaces, data, user manuals,

Test or Project Plans. Established procedures and checklists that are used by the contractor's SQA groups will be reviewed for completeness and consistency.

#### 6.4 GENERAL SQE ACTIVITIES

General Software Assurance activities will include, but not be limited to, the following:

##### 6.4.1 Requirements Management

The focus will be on verifying that the set of baselined requirements has been completely allocated to design and code modules. Full traceability will also be assessed.

##### 6.4.2 Internal and Formal Reviews

Records of formal design reviews as well as code reviews and walkthroughs will be examined for timeliness, completeness and closure of action items. Discrepancies and action items will be used to support NASA's Continuous Improvement effort.

##### 6.4.3 Software Testing Monitoring and Review

Records of test plans, procedures and results will be examined for completeness, accuracy and closure. All Test Anomaly Work Sheets (TAWS) reports (test anomalies generated by the ACS contractor) will be reviewed for closure, but most importantly, the testing of baselined requirements will be assessed. This data will be merged into other metrics activity.

#### 6.4.4 Configuration Management and Change Control

CM processes will be reviewed and assessed periodically in order to demonstrate complete version control of changes to all items - whether approved, disapproved or pending. Summary reports will be checked for assignments of issues to responsible individuals, and metrics will be captured which are appropriate for the project.

#### 6.4.5 Nonconformance Reporting and Corrective Action Tracking

Software non-conformance and related corrective actions will be reviewed for timely resolution and completeness. Compliance to 441 work instructions will be monitored on an on-going basis.

SCN 001

#### 6.4.6 Audits & Reviews

SQEs will perform audits or reviews on ground system elements, flight system elements and at Advanced Camera System (ACS) Contractor Facilities. These audits or reviews will look for establishment and adherence to standards and procedures to ensure quality software objectives. Sampling, review, and inspection of contractor quality records will be part of the assurance process.

SQEs check HST Operations status regularly to identify areas requiring SQE involvement [e.g. Failures and Failure Review Board (FRB)/Flight Readiness Reviews (FRR)] via issues and general concerns for specific problems in the HST operations area.

Configuration changes to HST (hardware, software, analysis, documentation, plans, etc.) are made via project Change Control



Boards (CCBs). SQEs will review and provide appropriate comments on CCRs for the FAM and will actively participate at Level IIIA CCB for issues relating to software. Similar coverage of the Ground System HSTOMS CCB activities will be provided.

#### 6.5 OTHER ACTIVITIES

SQEs will examine all HST Anomaly Reports (HSTARs) for Flight and Ground systems anomalies and derive input for the Code 300 Nonconformance Report/Corrective Action (NCR/CA) database tracking of HST spacecraft and ground systems problems. Engineers will be responsible for deriving and recording relevant information for input into the NCR database in accordance with GPG 5340.2. The SQE is responsible for entering this information into the NCR/CA database.

SCN 001

When required, SQEs will support Vehicle Electrical System Test (VEST) Software Review board meeting and witness selected activities and tests.. Furthermore, during VEST testing, SQEs may be required to review plans, procedures, test results, and software problem reports.

When applicable plans, procedures and records relating to non-deliverable software, Commercial Off the Shelf (COTS) or Government Off the Shelf (GOTS) will also be reviewed.

SCN 001

APPENDIX A  
HUBBLE SPACE TELESCOPE PROJECT  
ALERT PROCESSING WORK INSTRUCTION (Deleted)

| SCN 001

#### A.1 PURPOSE

This Hubble Space Telescope (HST) work instruction (WI) defines the process for the tracking and resolution of Government/ Industry Data Exchange Program (GIDEP) Alerts and other advisories that affect HST hardware.

#### A.2 SCOPE

All GIDEP Alerts and advisories (NASA or other) that affect HST hardware will be processed in accordance with this WI.

#### A.3 REFERENCE DOCUMENTS

NPG-8735	Procedures for NASA Alert Reporting of Parts, Materials, and Safety Problems
SPAR-3	Guidelines for Standard Payload Assurance Requirements for GSFC Orbital Projects
S-311-GP011 Rev A	GIDEP Alerts—Disposition and Maintenance
GMI 5310.3 Rev C	Alert Reporting of GSFC Parts and Materials Problems
EPIMS-WEB	EEE Parts Information Management System - WEB ( <a href="http://epims.gsfc.nasa.gov">http://epims.gsfc.nasa.gov</a> )

#### A.4 REQUIREMENTS

A system for the tracking and resolution of GIDEP Alerts and advisories as they affect the HST project shall be maintained and implemented by the Office of Flight Assurance. The OFA will conduct monthly searches of the HST parts lists entered into the EPIMS-WEB. Also, the HST Flight Systems and Servicing (FS&S) contractor will conduct their own independent searches of HST parts lists as each Alert is received.

## A.5 RESPONSIBILITIES

Flight Assurance Manager (FAM)—The HST FAM is responsible for assuring that Alerts/advisories affecting HST hardware are tracked and resolved. The FAM shall assign a Quality Engineer (QE) as the primary focal point for all GIDEP issues/concerns on the HST project.

Quality Engineer—The assigned QE for GIDEP matters is responsible for the following:

- a. Initiating queries of applicable HST contractors and in-house hardware fabricators to determine usage and/or recommend actions pertaining to the subject Alert.
- b. Coordinating with the contractors, in-house hardware fabricators, Code 311, HST Project, etc. to determine corrective action, if any.
- c. Maintaining tracking system of Alert activity and files containing historical information.
- d. Report summaries of Alert status to the HST FAM.
- e. Report Alert dispositions to Code 300 GIDEP Representative GIDEP focal point.
- f. Provide Code 311 match reports to the FS&S contractor.
- g. Notify HST Space Telescope Equipment Management Systems (STEMS) personnel of match reports and dispositions.

### A.5.3 Code 300 GIDEP Focal Point

The Code 300 GIDEP Representative assigned as the GSFC GIDEP focal point shall ensure that database searches are performed in accordance with the NPG 8735 GIDEP Alert Procedure and that the results of the searches are promptly reported to the HST FAM.

#### A.5.4 Project Parts Engineer (PPE)

The HST PPE is responsible for assisting the FAM, as requested, in the resolution of any Alerts. This shall include recommendations for use-as-is, replacement or further testing.

#### A.5.5 Flight Systems and Servicing (FS&S) Contractor

The FS&S contractor is responsible for reviewing GIDEP Alerts received from the GIDEP office and for performing an independent search of the available HST parts lists to determine if any matches exist on HST hardware. Match information will be provided to the FAM. All Alert Match reports received from EPIMS - WEB or Code 300 will be provided to the FS&S contractor to help ensure that they are informed of any matches possible missed by their searches.

### A.6 INSTRUCTIONS

#### A.6.1 Parts Lists

The PPE shall ensure that parts lists received on new-build hardware are forwarded to the GSFC GIDEP Focal Point and entered into the EPIMS - WEB database.

#### A.6.2 Match Reports

The Alert Match reports are available on-line in EPIMS - WEB for the HST FAM or will be provided by Code 300.

The FS&S contractor will be provided these reports for information and/or action. In addition to the EPIMS - WEB searches, the FS&S contractor will independently review GIDEP Alerts they receive directly from GIDEP and will determine if any matches exist to HST hardware. The FS&S contractor

will report any match information immediately to the FAM. Any Alert matches will also be provided to the PPE.

For HST spare hardware and any HST in-house hardware being fabricated, the FAM is responsible for submitting the Alert disposition form (Figure A-1) for each exact and potential match to the PPE within 21 calendar days of receipt of the Alert match reports. The Alert Disposition form will also be completed for matches discovered by the FS&S contractor.

The assigned QE will enter the match information, along with the data of receipt of the match reports, into an Alert tracking database. The Alert tracking database will be maintained as the status changes of each match evaluation.

The assigned QE will confirm the matches by querying the appropriate contractor or GSFC personnel and work with the PPE, contractor, and any other necessary GSFC personnel to formulate a recommendation for resolution. The recommendation will be presented to the FAM. If approved by the FAM, the FAM will coordinate the recommendation with the HST Project. The Alert Disposition form will then be completed by the QE and forwarded to the PPE.

Any hardware where rework/retrofit is considered necessary will be red-tagged by the QE as approved by the FAM.

For those parts confirmed as no matches, the Alert Disposition form will be completed by the QE and forwarded to the PPE, the FAM, and the Code 311 GIDEP focal point.

## Alert Disposition Form

Project \_\_\_\_\_ FAM \_\_\_\_\_ Date \_\_\_\_\_

Alert Number \_\_\_\_\_ Part Number \_\_\_\_\_

### Part Disposition:

\_\_\_\_ Part used as is.

\_\_\_\_ Part not used.

\_\_\_\_ Part replaced by:

\_\_\_\_ Part to be rescreened.

Task No. \_\_\_\_\_

Results: \_\_\_\_\_

\_\_\_\_ Part Scrapped

\_\_\_\_ Part not received.

\_\_\_\_ Other (specify): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Signature)

\_\_\_\_\_  
Project FAM

\_\_\_\_\_  
Date

Figure A-1. Alert Disposition Form

For hardware being contracted outside GSFC, the FAM is responsible for reviewing and approving the project contractor's Alert dispositions and forwarding the approved dispositions to the GIDEP focal point. The HST database will be updated by the assigned QE.

Any Alerts impacting Safety will be coordinated with the HST Safety Manager.

See the attached flowchart (Figure A-2) for a simplified :  
representation of the GIDEP Alert processing for HST.

#### A.6.3 Residual Risk List

Any Alerts impacting HST hardware identified as adding risk shall be included in the HST Residual Risk List (maintained by the FAM). This may include items requiring long term corrective actions or the lack of sufficient corrective actions.

#### A.6.4 Future On-Line Access

The start of 1998 will mark the availability of On-Line Access to GIDEP in the form of (EPIMS - WEB) so that designers can make concurrent searches while flight hardware is in the design stage.



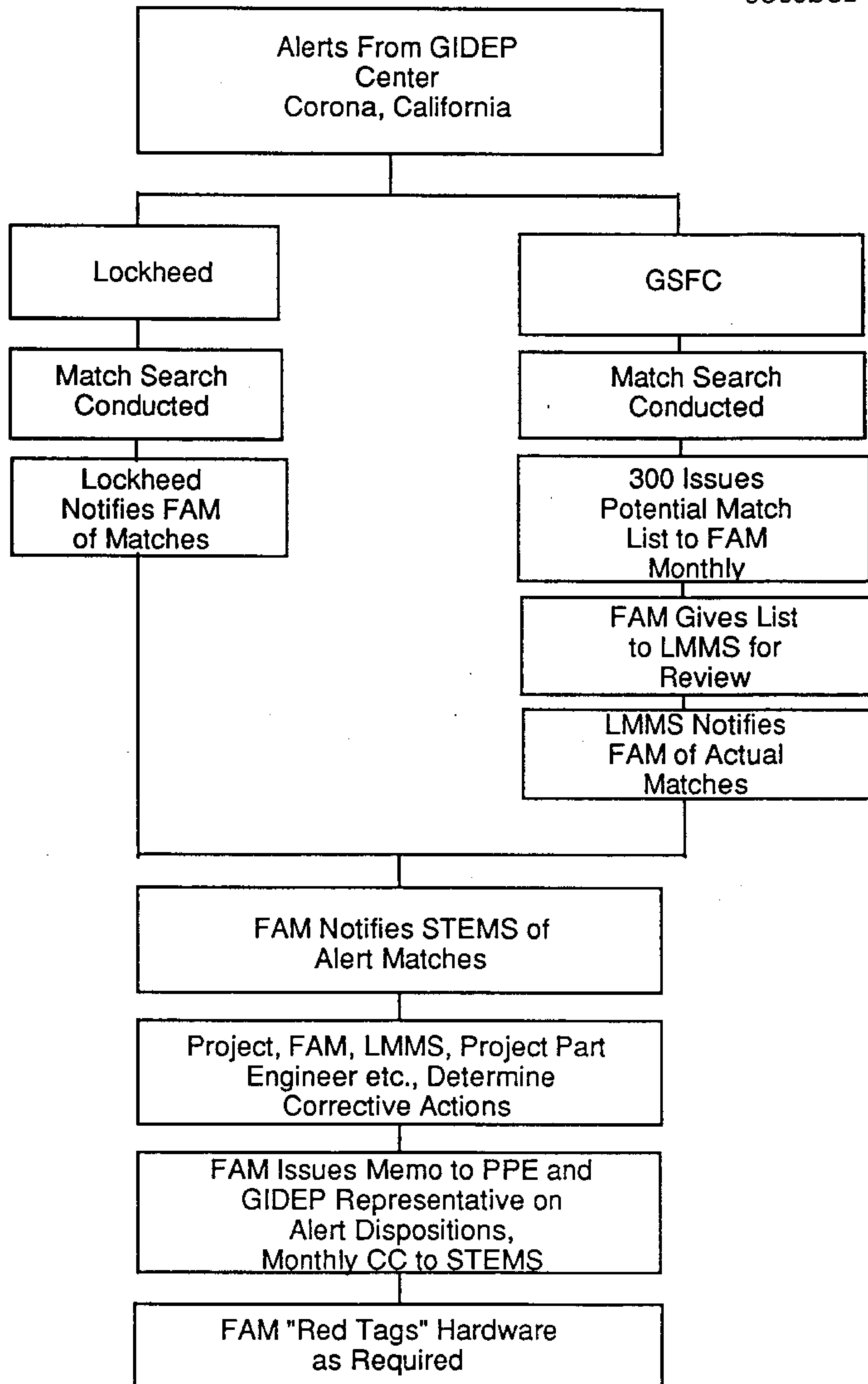


Figure A-2. GIDEP Alert Processing for HST